AD#-103

WELDMENT PLATE SPACER/SUPPORT

Background and Summary of the Invention

The present invention relates to the manufacture of concrete walls used in tilt-up construction. More particularly, the present invention is directed to a spacer/support that holds a weldment plate in proper position until the wet concrete sets up.

In commercial construction, as well as in residential construction where wood is at a premium, builders are increasingly using tilt-up construction, that is, they are pouring concrete walls in forms as they lay on the ground, floor or other surface, and then tilting them up into the desired position after the concrete has cured. One of the features such construction affords is the placement of a weldment plate on one surface of the wall so that structural support beams, and the like, may be welded/secured between adjacent walls. In current practice, the concrete wall is poured and then the weldment plate is "floated" on the top of the wet cement. Since these steel plates are denser than the wet concrete, they tend to sink below the surface. Accordingly, it sometimes becomes necessary to allow the concrete to take a partial set and then attempt to push the weldment plate into the desired position. Neither of these current practices provides effective quality control and the results often are not those desired.

The device of the present invention comprises a spacer/support that engages the support surface on which the concrete wall is poured and a weldment plate holding it in the desired position relative to that surface during the curing of the concrete. The spacer/support comprises a body portion having a length substantially equal to the thickness of the concrete wall minus a dimension of the weldment extending in the direction of the thickness of the concrete wall; a surface engaging portion for contacting the surface on which the concrete wall is poured and supporting the weldment in a position appropriately spaced from that surface; means for attaching said body portion to the weldment; whereby the weldment will be maintained in a desired position as wet concrete is poured

and sets up.

Weldment plates take different forms: some are simply rectangular metal plates with two smooth surfaces. Other weldment plates are equipped with protrusions on one surface that improve the adhesion of the plate to the wall enabling greater weight to be suspended therefrom. These protrusions typically take the form of a plurality of Nelson studs welded to the surface of the plate that is to be embedded in the concrete. These studs can have shaft diameters of $^1/_4$", $^3/_8$", ½", $^5/_8$" with head diameters graduated by $^1/_4$" increments between ½" and $1^1/_4$". For weldment plates that have no protrusions, the support/spacer will have additional length (as compared to those engaging the heads of Nelson studs) and be equipped with a flat head that can be adhered to the nether surface of the weldment plate by an adhesive such as LIQUID NAILS (a registered trademark of Macco). A minimum of three spacer/supports will be used on each weldment plate positioned in a triangular pattern to provide balance in the wet concrete. The embodiment of support/spacer engaging the Nelson stud will have a plurality (three shown) of fingers that grip the head of the stud, the fingers having portions that snap beneath the head and retain the spacer/support in position while the concrete sets up. This configuration will be made in a plurality of sizes to accommodate the various sizes of Nelson stud heads.

The spacer/support is preferably made of a material selected from the group consisting of plastic, metal, and powdered metal. The end contacting the support is preferably pointed to minimize the surface treatment needed for the wall and, typically, the wall may simply be painted, papered or given any other conventional treatment, without the tips of the spacer/supports affecting the treatment. The length of the body portion of the spacer/support may be adjusted in either of two ways: the surface may be scored at any of a plurality of conventional lengths, and the spacer/support cut to the length appropriate for the wall thickness with which it is used; the spacer/support includes two parts that may be adjusted relative to each other to achieve the desired length. Preferably, these pieces are threadingly engaged and the length can be readily adjusted by rotating one of the pieces relative to the other. This feature may be added to either the flat-head or fingered configurations.

Various other features, advantages and characteristics of the present invention will become apparent to one of ordinary skill in the art after a reading of the following specification.

Brief Description of the Drawings

The preferred embodiment(s) of the present invention is/are described in conjunction with the associated drawings in which like features are indicated with like reference numerals and in which

Fig. 1 is a side view of a first embodiment of the weldment spacer/support of the present invention shown assembled on a Nelson stud;

Fig. 2A is an exploded side view of the spacer/support shown in Fig. 1;

Fig. 2B is a top view of the first embodiment;

Fig. 3 is a schematic view showing the spacer/supports used to suspend a pair of weldment plates on a tilt-up wall; and

Fig. 4 is a second embodiment of the weldment spacer/support of the present invention for use with a weldment plate.

Detailed Description of Preferred Embodiment(s)

A first embodiment of the weldment plate spacer/support is shown in **Figs. 1-3** generally at **20**. Weldment spacer/support comprises an elongated body portion **22**, a surface engaging portion **24**, and means **26** for attaching the spacer/support to weldment plate **11**. In this embodiment, weldment plate **11** includes projections **15** which may take the form of Nelson studs welded to the surface **13** of weldment plate **11** to be embedded in the concrete **17** (**Fig. 3**). Body portion **22** is of a length substantially equal to the thickness **t** of the concrete wall **18** minus a dimension of the weldment plate **11** extending in a direction of the thickness of the concrete wall **18**. In this case, the dimension of the weldment plate extending in the direction of the thickness of wall **18** includes the thickness of plate **12** as well as the length of Nelson stud **15**. Nelson studs come in a plurality of sizes and lengths. Common diameters include $^1/_4$", $^3/_8$", ½", $^5/_8$" with head diameters of ½", $^3/_4$", 1" and $1^1/_4$", respectively. The heads **16** also vary in depth having lengths of 0.187 inch, 0.281 inch, 0.312 inch, and 0.312 inch, respectively, for the diameters listed here. The length of body portion **22** will be designed to position the weldment plate **12** where desired, typically with upper surface **14** flush

with the surface **19** of wall **18**.

Surface engaging portion **24** preferably comes to a point **25** so as to minimize the amount of weldment spacer/support that protrudes on surface **21**. Accordingly, minimal accommodation will be necessary to treat the points **25** on wall **18**. In fact, it is anticipated that the painting, papering or other treatment provided wall surface **21** will adequately cover the points **25**. It is preferred that the length of body portion **22** will be adjustable. One such means can be the cutting of body portion **22** to the desired length to place weldment plate **12** flush with the designed wall surface **19** once concrete **17** is poured. To facilitate this cutting (or breaking), body **22** may be provided with scoring lines **28** at one or more conventional wall thicknesses/stud lengths so the point **25** may be maintained.

The material from which weldment plate spacer/support is made is selected from the group consisting of plastic, metal, and powdered metal. It is envisioned that a durable, tough plastic material such as nylon or polypropylene, possibly with glass or carbon fiber reinforcement, will be suitable for this application and provide the most cost effective means of solving this problem. It is, however, possible that for certain applications, the strength requirements will dictate that the weldment plate spacer/support **20** be manufactured from metal including but not limited to powdered metal. The spacer/support **20** of the present invention could be cast or machined from aluminum, from example.

Means **26** for attaching body portion **22** to weldment plate **11** comprises a plurality of fingers **30** (shown exemplarily as three in number) with portions **29** that snap in behind stud heads **16**. As seen in **Figs. 2A** and **2B**, fingers **30** are equally spaced about the periphery of head securement **28**. However, it is envisioned that as few as two and as many as six fingers could be utilized to effect attachment to head **16**. If only two fingers **30** were utilized, they would have an extended peripheral span to stabilize their hold on head **16**. It is preferred for stability reasons, that there be three or more fingers **30**. The depth of head securement **28** will be sized to accommodate the length of stud head **16** and the diameter will similarly be properly sized to receive the particular diameter of stud head **16**.

A second embodiment of weldment plate spacer/support is shown in **Fig. 4** generally at **20'**. In this embodiment, body portion **22'** is formed by a first component **32'** and a second component **34'** that can be longitudinally moved with respect to each other to vary the length, as desired. This

variation in length is effected by rotating one of the components **32'**, **34'** with respect to the other. The complementarily engaged threads **33'** and **35'** will produce the desired variation in length. The head **31'** of first component **32'** is designed for attachment to a weldment plate **12** that has no projections. An adhesive, such as LIQUID NAILS may be used to secure the spacer/support **20'** to the surface **13** of weldment plate **12**. A minimum of three spacer/supports **20'** dispersed in a triangular pattern will be needed to assure stable placement of the weldment plate **12**.

In use (**Fig. 3**), weldment plate spacer/supports **20** are attached to weldment plate **11** as by snapping finger portions **29** over projection heads **16**. At least three such spacer supports **20** configured in a triangular pattern should be used to ensure stability. The length of spacer/supports **20** will have been previously adjusted to position the surface **14** at the desired reference plane with respect to upper surface **19** of concrete wall **18**. The thusly equipped weldment plate **11** is situated inside concrete forms **41** on surface **43** which may, for example, be a plastic sheeting material, and concrete **17** poured into forms **41**. Weldment plate spacer/supports **20** hold plates **11** in the desired position while the concrete **17** sets up. When the concrete **17** has properly set, tilt-up wall **18** can be uprighted and secured in position. The smallness of points **25** will have minimal/no effect on the surface treatment required to finish wall surface **21**.

Various changes, alternatives and modifications will become apparent to one of ordinary skill in the art following a reading of the foregoing specification. For example, while the two component adjustable embodiment has been depicted only with the flat head design, it will be understood it can easily be adapted for use with the fingered securement head **28**. It is intended that any such changes, alternatives and modifications as fall within the scope of the appended claims be considered part of the present invention.